

# Project Proposal Template

Project Management and Software Development  
for Medical Applications

## General Info

Project Title: Object detection using part-based models

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## Project Abstract

The goal of this project is to evaluate the current state-of-the-art object detection methods. The model of pictorial structures will be employed for representing the human body as a configuration of connected parts. Every part has particular appearance and relation with another part. These two properties will be learnt through training. Two different appearance models will be evaluated based on shape context descriptors and histograms of oriented gradients descriptors (HoG). Using this descriptors two types of classifiers AdaBoost and SVM will be trained and tested.

The code for pictorial structures based on shape context and AdaBoost is available. The same code has to be used for testing AdaBoost with HOG descriptors. The same has to be done by replacing AdaBoost classifier with SVM classifier (the library implementing SVM will be provided).

## Background and Motivation

Currently, the state-of-the-art people detectors rely on detecting the parts of the human body and afterwards human body pose based on these detections. Part-based detectors became an

efficient way to detect objects under occlusion,



deformations and appearance variations. The human body is defined as a collection of the parts put in a certain configuration (human body pose). Moreover, the parts are connected into an acyclic graph for creating pair connections. The connections between the parts and the appearance models are learnt during training. The appearances are encoded using different descriptors like shape context or HoG. Equally for training different classifiers can be used. Thus, it is interesting to compare different descriptors defining the body parts and different classifiers used in literature.

## Student's Tasks Description

The student will accomplish the following tasks:

- Compile the part-based detection code from [1]
- Train using the Shape Context Descriptor
- Train using the HOG Descriptor
- Replace the Adaboost classifier with an SVM and retrain.
- Evaluate the results for each case

## Technical Prerequisites

The student should be familiar with features selection algorithm and object detection. In addition, the student should have experience with C++ and Matlab (optionally OpenCV).

Please send the completed document to us ([Shakir@in.tum.de](mailto:Shakir@in.tum.de)) before the project proposal deadline, **September 30**.

Please note that this proposal will be evaluated by the BMC coordinators and will be assigned to a student only in the case of acceptance.



### Administrative Info

Working Time: ~100 programming hours

Project Location: Home, working in the university is not mandatory.

Required Equipment: A personal computer

### Timeline and Milestones

There will be three milestones (including presentations) and weekly meetings.

### References

[1] Pictorial Structures Revisited: People Detection and Articulated Pose Estimation, M. Andriluka, S. Roth, B. Schiele (CVPR09).